

Contents

Preface	ix
Acknowledgments	xi
1. Teaching Middle School Mathematics in Six Countries	1
Nedjalka Dimitrova—A Middle School Mathematics Teacher in Bulgaria	2
Lukas Becker—A Middle School Mathematics Teacher in Germany	5
Javier Lopez—A Middle School Mathematics Teacher in Mexico	8
Eun-Young Choe—A Middle School Mathematics Teacher in South Korea	10
Fong Wang—A Middle School Mathematics Teacher in Taiwan	12
Judy Brazil—A Middle School Mathematics Teacher in the United States	15
2. System Snapshots: K–12 Schooling, Teachers’ Roles, and Teacher Preparation	19
Bulgaria	20
Germany	22
Mexico	27
South Korea	31
Taiwan	34
United States	39
Who Chooses to Become a Middle School Mathematics Teacher and Why	42
What Future Middle School Teachers Will Be Expected to Teach	47
What Future Teachers Bring to Their Teacher Preparation Programs	55
3. What We Studied and How We Did It	58
Theoretical Framework	59
Study Design	68

4. What Are the Components of Teacher Education? What Opportunities Are Offered, and What Do Future Teachers Take?	76
How Much Time Is Available for Teacher Preparation?	78
What Amount of Coursework Did Future Teachers Take?	81
Mathematics Course-Taking	85
Formal Mathematics Pedagogy	93
General Pedagogy	100
Practice-Related Opportunities	104
How Do All These Opportunities Fit Together?	114
Some General Conclusions	121
5. What Do Future Teachers Know?	123
Assessing Future Teacher Competencies	123
Formal Mathematics Knowledge	126
Mathematics Pedagogical Knowledge	133
What is Mathematics Pedagogical Knowledge?	139
6. Measuring and Characterizing the General Pedagogical Knowledge of Future Teachers	143
Theoretical Framework	143
Methods	150
Lesson Planning	153
Social Class and the Achievement Gap	158
Assessing Students	162
Summary	164
7. What Do Future Teachers Believe About Teaching, Learning, and Mathematics?	166
Epistemological Beliefs About the Nature of Mathematics and How to Gain Mathematical Knowledge	167
Epistemological Beliefs About the Nature of Schooling and Teaching	181
Summary and Conclusions	187
8. How Might We Expect Future Teachers to Teach?	188
Classroom Management	189
Instructional Organization	194
Instructional Activities Specifically Around Mathematics	206
A Typology of Instructional Activities	208
Summary	211

9. Using Cohort Comparisons to Explore How Future Teachers Change During Teacher Preparation: Difficulties, Findings, and Hypotheses	212
What to Look for and Where	215
Cohort Comparisons at the Institutional Level	218
Cohort Comparisons at the Country Level	223
Summary	227
10. The Role of Opportunity to Learn in Teacher Preparation	228
Research Related to Teacher Preparation	228
Modeling the Relationship Between OTL and Teacher Competencies	229
Relationship of OTL to Future Teacher Competencies—Knowledge	230
Relationship of OTL to Future Teacher Competencies—Beliefs	239
Summary	254
11. The Cost of Teacher Preparation	257
Country Spending on Teacher Preparation	259
The High School Advantage	264
The Recruitment of High Mathematics Ability Students into Teaching	268
An Approximation of Cost-Effectiveness of Teacher Education	273
Summary	275
12. Concluding Thoughts and Some Hypotheses	280
Notes	293
References	301
About the Authors	317
Index	323